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AN ILLUSTRATED MONTHLY DEVOTED TO PHOTOGRAPHY IN ITS WIDEST SENSE

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AMERICAN JOURNAL
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GOOD TONES DEPENDENT UPON THE RELATION OF THE TONING BATH TO THE SILVERING BATH.

J. HENDERSON.

IN a recent number of your journal you say in connection with the new self-toning paper that toning is the "pons asinorum" for the amateur. The photographic road is comparatively easy travel, and very presentable results in negative work are the fruit of his painstaking endeavors, but the great majority of amateurs when they wish for a perfect translation of their negatives into a paper positive consign their film excellencies to the professional printer, and do not rest satisfied with their own efforts at printing and toning.

I have frequently heard amateurs say that they wished for some method for fixing the print directly after it had reached a proper degree in the frame, lamenting that all the fine effects were nullified by the subsequent toning and fixing which is necessary for the completion of a silver print. Of course they hail as a boon any such device as self-toning papers, or have recourse to developing papers.

Your samples of self-toning paper illustrating your last journal are certainly excellent, but are not comparable with perfect printed and toned albumen prints, though superior to many

aristos. In fact, I think it will not be long before photographers will be compelled to return to the old reliable silver albumen. When properly done nothing equals the productions. I do not except even platinum or carbon, for variety of tints and constancy in producing.

In aristo one can hardly anticipate the color of the tone, and it seems next to impossible to secure uniformity in any number of individuals. The permanency of aristos, though not as doubtful as a few years back, is still looked upon askance and doubtingly, while I think the permanency of old silver prints, where the manipulation has been proper, is assured. At least, the method has had the test of a quarter of a cntury.

But I am not writing as an advocate of albumen silver, and would be quite as ready as anyone to accept any shortening process which would give us good result, but I believe the motto "nil sine labore" holds in photographic practice as well as in other professions. My object in these rather discursive remarks is to show the cause of failure with amateurs in securing beautiful tones. There is a relation between the bath used in silvering the albumen paper and the bath used in giving the tones, and this relation must be observed if success is uniformly desired. One must know the constitution of his nitrate of silver solution which he spreads on the albumen paper to hold in control and abeyance the gold solution to which the print is consigned, and thus secure its perfect evolution, and not trust to its working out its own salvation at the mercy of the chemicals.

The ignorance of the chemical nature of the film in the aristo papers (which is, of course, a secret of the only perfect papermaker) is par excellence the reason for uncertainty of tone, and the consequence of disagreeable, inartistic, flat-looking prints which disappoint the expectancy of the possessor of the good printing negative, and for that matter in this case the professional also. I am sorry our profession is degenerating into the lazy pacing, self-contented class, which takes anything which will save them the trouble of working for themselves. The perfect workman is one who, when the case demands it, can look into the condition of things, and investigate for himself the cause of

trouble. The rising generation of photographers (I do not wish it to be understood that I am by reason of a heavy weight of years a conservative, for my connection with the profession does not much antedate the modern dry-plate) have not that education and training which one meets with when conversing with intelligent wet-plate workers, who were in a measure possessed of chemical knowledge at least sufficient to investigate any pitfall in manipulation. They knew how to doctor their baths, and did not supinely put up with best possible under the circumstances. But to stick to my purpose in writing you this paper which your really excellent specimens of self-toning paper you kindly sent me provoked, which I do really prefer to the great majority of aristo papers which offend my eye in almost every showcase, but I still maintain the standard of albumen silver, and shall till something else equals it in the beauty of tones.

I said the cause for ugly, inartistic tones is to be traced to the neglect of regulating the relations between the printing and toning baths.

There ought to be a harmony between them, or disaster and woe will follow for the neglect to secure it.

It is the belief with the majority of photographers that it is a matter of little importance so long as the silvering bath is alkaline. Their belief is that alkalinity of any degree will prevent flat or dingy prints.

Let us watch the process of the print as it leaves the frame, at a degree which satisfies the eye of the printer, and fills him with anticipations of the final result. With interest he watches the action of the gold bath upon it; feasts his eyes on its evolving beauties as the red tinge begins to assume the richer and more delicate tones contributed by the gold solution. His heart is full of delight as he removes his galaxy of beauties from the toning dish to the washing tank, and he anticipates on the morrow the perfect consummation of his ardent desire.

The morrow dawns, but no visions of delight, a batch of flat, tame, and unprofitable productions. It was the hypo, of course, that ruined all those yesterday lovely tones. They were perfect beauties when they left his hands, and he uses rather strong

language about the inefficiency of subordinates who cannot be trusted with the simple operation of fixing a few prints. Or, if the photographer has done his own fixing and finals, and finds for his pains only blue and pinched-looking results, then he vents his anathemas on the chemicals, and deplores that one cannot get pure gold nowadays. Brother, the chemicals are in ninety-nine cases in a hundred all right, but they are inflexible agents, and work according to the fixed principles the Creator has imposed. Exercise your judgment, and you will trace the cause of your disaster to the silvering bath which has not been made to work in harmony with your properly constituted gold toning bath. According to dictum you made your silvering bath alkaline, but alkaline with a vengeance, like the amateur who told me the remedy in development for overtiming was to chuck in bromide. You have chucked in alkalis. Or, perhaps, with all your care an unsuspecting cause of over-toning from alkalinity may be traced to the practice of strengthening your silver bath by increments from the stock bottle. You have a concentrated solution of silver nitrate with which you replenish the depletion of your silvering bath, which the absorptive action of the albumen occasions. If care is not taken in the preparation of the stock solution it is apt to be too alkaline, and so communicate its alkalinity to the paper silvering bath, with the disastrous results. When you test your silvering bath for strength of silver, do not forget to test it also for alkalinity. Without alkalinity of silvering bath as well as alkalinity of toning bath there can be no delicacy or beauty of tones, but don't expect to achieve the same by over-doing the matter.

When the silvering bath is only slightly alkaline, and the toning bath likewise, then you have the proper harmony established between the two. When prints produced by over-alkaline silvering are placed in the gold bath, which is also alkaline, that gold is precipitated upon the silver, and if the toning bath is not too strong, the process goes on slowly and beautifully as far as appearances are concerned, and the tones are fair and all that one could desire to look upon, but like the tree in the Garden of Eden, carry with them the seeds of future woe, and the final

result, despite the care expended, is only an unsightly over-toned print.

I am prompted to write these remarks and admonitions because I do not believe that the silver print, as some one facetiously remarked, has been consigned to the limbo of innocuous desuetude, but like John Barleycorn will rise again, and from indications on the other side of the sea it is already displacing aristos, for which, as the boys say, "I have no use."

A FEW HINTS ON MOUNTING AND FINISHING.

GEORGE RAU.

TOO little attention is paid to the best means of mounting and finishing photographs. In the early days of the art the prints were attached to the cards by their outer margins only. It was feared that the paste employed might injure the photograph, and the truth is many antique prints so mounted have only faded at the parts touched by the mountant. But in practice such a method could not be carried out. Prints mounted partially in this way have not the same finished appearance as those completely attached over the whole surface of the mount.

The necessity of using a mountant which shall have no chemical action upon the print is apparent.

Ready prepared pastes may be convenient, but their use is attended with considerable risk. The substances employed to preserve them from decomposition are often inimical to the print. Photographers generally discard them, and make their own paste. Starch, gelatine, cornstarch, India rubber dissolved in benzole, are had recourse to. India rubber, though an excellent adhesive, is liable to decomposition, and will cause the print to peel off the mount.

Starch paste on the whole is the best material, and the one generally employed. It is very clean, easily made, and does not set too quickly, and may be applied without fear of drying before it can be applied to the mount.

The dry starch should be smoothly mixed with cold water to the consistency of a thick cream, and then boiling water poured on it until the required thickness is attained, stirring constantly while pouring the hot water. When cool, it is ready for use after removing the skin formed over it by cooling, as this if mixed with the body of the starch would cause it to be lumpy. Some kinds of starch require boiling. If lumps should form in the starch it must be strained through cheese-cloth.

When photographs are to be mounted on paper or in books, every care should be taken to prevent the paper from cockling or puckering up, and if the prints are fastened to the paper over their whole surface a quicker drying material should be used than starch. Some employ fish glue, but the acid employed in the solution of the glue acts most disastrously in a very short time upon the picture, and should not be used even around the margins. Perhaps solution of India rubber in chloroform would be preferable.

All prints should be carefully trimmed, so that no ragged edges appear or irregular shapes, and if the prints are mounted dry they may be made flat by drawing a thin smooth edge across the back.

To mount a wet print, it should be laid upon a smooth surface, face down, and the superfluous water squeezed out, and the paste applied over the back, taking care that every portion is covered with the paste. It is then picked up with the point of a knife, and applied to the mount. Very little experience will enable anyone to place a print correctly on the card without any marks or guides. Albumen silver prints may be rubbed down after mounting by placing a blotter over them, and passing over them with a hard piece of wood made for the purpose. The blotters employed should be of the variety which is free from lint.

Albumen prints are dried between blotters, but high gloss prints must be allowed to dry spontaneously, and when mounted cannot be rubbed down, but should be gently brushed over with a soft silk sponge dampened. If left to dry with face down the print is not as likely to curl up when dry, but if this plan is

adopted for high gloss, care should be taken to prevent their sticking. Platinum prints do not require any particular care in drying, and may be placed between blotters. Bromide prints, however, must be treated like high gloss prints.

To mount prints on stretchers. After having stretched the muslin on the frame, paste its surface thoroughly with the starch paste, and apply it to the pasted print, and rub down with a soft sponge as before.

Photographs mounted in what is called optical contact with the glass have a very finished appearance. To mount prints in this manner, make a solution of gelatine not too strong, about 60 grains to 3 ounces of water, and filter it while warm through muslin, and pour it into a flat dish. Immerse the print into this face downward. Place in a perfectly clean and clear piece of glass under the print, and then carefully withdraw both. Squeeze all superfluous gelatine from the print, and set aside to dry.

A few words on spotting may not be out of place, as many an excellent print is marred by careless spotting where no pains is taken to match the color, and the result looks like an old patch on a new garment. One would imagine there should be no great difficulty in spotting a photograph, but many fail dismally in doing it clearly and neatly. The first consideration is the color.

Prints on albumenized paper, gelatino chloride, collodio chloride, high gloss as they are called, may be spotted with a mixture of India ink, indigo, lake, and sepia, warm or colder according to the tone of the print. This must have a small amount of gum arabic added in order to repeat the surface of the paper.

To spot platinum or bromides the color is India ink and neutral tint mixed without gum.

To spot carbons use Venetian red, a little crimson lake, and Antwerp blue. The color of red carbon is rather deceptive. There is a bluish tinge in it. Gum and oxgall must be added, as the surface is somewhat slippery. Of course, other colors than red carbon are matched with different pigments.

The color should be placed right on the spot, and not to the

side of the white space. A little practice will enable you to take up the proper amount of color. The spotting brush should be examined, to see that no straggling hairs project. A print is not spotted when the black speck is substituted for a white one. The blank must be made invisible, and this can only be done by correctly matching the tint. It is best to use fresh rubbed up color, as the tint may be thus easier matched.

In burnishing the best lubricant is castile soap, applied with a canton flannel rag. Or the soap may be dissolved in alcohol, by which the unpleasant escape of soap particles is avoided. The burnisher should not be so hot for high gloss prints as for albumen, as the heat is likely to change the color. The prints should not be burnished while too damp for obvious reasons, but if dried too long a time it is more difficult with albumen to get a fine polish.

A DEVELOPER FOR NEGATIVES BY A PRACTICAL WORKER.

The following formula by a practical worker will be found of general utility, giving good printing, density and a pleasing color :

A.

Water, ...	32 oz.
Sulphite soda (crystals), ...	2 oz.

Dissolve and make acid with sulphuric acid, then add Eikonogen 160 grains, Hydrochinone 160 grains.

B.

Water, ...	32 oz.
Sulphite soda (crystals). , ...	1 oz.
Carbonate of potassa, ...	4 oz.

For normal exposure, equal parts of A and B, and equal bulk of water.

TO PREVENT CARBON SPLITTING FROM THE GLASS AFTER DEVELOPMENT.

WILLIAM BELL.

THE carbon worker is frequently troubled with the splitting and scaling off of the film from the glass support, and many a beautiful transparency is ruined thereby. To prevent this mishap I have recourse to the following method, which is at once a simple and effective remedy, or rather, preventive:

Distilled water	32 ounces.
Albumen	1 ounce.
Bi-chromate ammonium	32 grains.
Liq. Ammon.	1 dram.

Beat up the white of an egg to a froth, add the water, and beat up again well; then add the bi-chromate of ammonium and the liq. ammonia. Having previously soaked the plate in nitric acid, wash it thoroughly under the tap. Filter the albumen solution twice, and flow it over the glass as is done in the albumenizing for wet-collodion, and pour off at one end; drain and dry; then expose the prepared plate to white light (five minutes in sun will be sufficient), and store away from dust for future use. There will be no liability of detachment of the film, and the method will contribute to the durability of the transparency. It might be thought that the yellow color of the bi-chomate solution would interfere with the integrity of the high lights, but as the transparency is viewed by transmitted light no effect is noticeable upon the clear portions of the positive. The scarcely perceptible tinge has rather, on the other hand, a softening effect which adds greatly to the beauty of the transparency.

The following will also be found a preventive of cracking of developed carbons. Rock the print in the solution for three minutes, and hang up to dry without further washing.

Water	32 ounces.
Glycerine	2 ounces.
Liq. ammonia	½ ounce.

VALUES.

WE now come to the consideration of another feature of painting intimately connected with light and shade, tone, and perspective, and vitally important to every picture—be it in high colors, in monotone, or simply in black and white; namely, values. Definitions of the term vary widely in meaning, and before trying to define it I choose to explain it, if possible, by illustration.

If you will hold out your open hand before you, partially close your eyes, and look, not for the outline or shape of a hand, but for patches of light and shade, you will see that the palm which is directly before you has the highest light upon it, and that there is a gradation of light into shadow in the spaces between the fingers, and around the ball of the thumb and the sides of the hand where they lead to the edges. Those gradations of light and shade which necessarily involve gradations of flesh color, and possibly the reflections from side lights, are values. Look closely at the face of a friend, a young lady for instance, and you will see high lights on the nose, cheek-bones, forehead, and chin. The side of the nose is slightly in shadow which runs up into high light again as the cheek is reached, and then the shadows begin to deepen once more as your eye follows around toward the ear. Under the chin and around the throat are still deeper cast in shadow, and if Rembrandt were painting her portrait the lines of the neck at the sides would be almost lost in darkness. Look at the red jacket she is wearing, and note the shadows in the fold of the sleeve at the elbow; look closely, for the shadow does not make blackness, but only a depth of red. These again are values. If you were looking down the street and two people dressed precisely alike—say policemen—were standing in a line of sight, yet at different distances from you, one at twenety, the other at a hundred yards, the difference in the color of their clothes would be apparent at once. The one near you would appear of stronger coloring than the one farther away. This result would be produced by intervening atmosphere and the reflection

from surrounding objects, and such effects as these again are called values.

It will be understood, then, that what are known in art parlance as values are the variations of light, the effect of intervening atmosphere, and the reflections from surrounding objects or colors, all combined. Properly speaking, values are nothing more or less than the relations of light and shade; but, as the word is generally used to signify the complicated instead of the simple relations of light and shade, I choose, for the sake of simplicity, to consider it in its popular sense, as something sufficiently different to be known by its own name. There is no great unanimity of opinion among artists and critics regarding the meaning of the term, and what it includes. A number of writers have tried at different times to define it properly; but it has such a loose meaning that definition is quite impossible. Littré decides that it is a tone of color relative to neighboring tones; and Véron says in substance that it is the affinity of color notes to white light. Any sententious or aphoristic definition of it is likely to be either confusing or erroneous, so you would better consider values as being the changes wrought in color or light by surrounding colors, objects, or atmospheres.

The working of these various modifiers may be illustrated by taking as an example the full-faced portrait of a young woman. In order to give the face and figure relief, chiaroscura, or light and shade in its simplest form, is used. The nose, cheeks, chin, and forehead are high in light, and the back parts of the head and neck are graded away into the shadows of the background. These gradations are, in the second place, qualified by the flesh colors of the face, which are likewise graded in a descending scale proportionate to the quantity of light they receive. Thirdly, if the young woman be represented at the end of a long room or gallery instead of close to view upon a neutral ground, the element of atmosphere will enter in and change the appearance of the whole. Fourthly, the appearance of the face will be changed again if a hat be placed upon the head. Suppose this hat to be one of red felt, such as is often worn by young ladies when playing tennis. The brim, extending out over the face, would

cast the forehead and eyes in shadow; the shadow would be affected by the flesh tint; and again the flesh tint would take its coloring from the reflection of the red felt.

It will be seen, then, that the complicated problem of values enters into all parts of a picture, whether in high light, half-tint, or shadow, and that its proper solution is vitally important to the production of good art. Moreover, values are quite as important in one kind of painting as in another—in landscape as in figure-pictures. Very likely you have never noticed their existence in nature, but the next time you are out walking and chance to see a maple-tree in foliage, look at it for something more than an outline against the sky and green color. Look for patches and spots of light and shade, or patches that seem of a darker or a lighter green than others. If you study the tree for a time you will discover a number of tints of green in it caused by the different quantities of light or of shadow. These again are valueless, and the next time you see a pictorial representation of a maple, under similar conditions of light and surroundings, and you find no reliefs of green by patches of darker or lighter green, you may make up your mind that the values are not true. But before you pass condemnation on the picture be sure—very sure—that you are right about the existing conditions of light. That same maple-tree will appear one shade of green if you look at it with the sun before you, and an entirely different shade of green if you look at it with the sun behind you; under a red glowing sky it will appear a deep green, but under a cold blue sky it will be grayed down some degrees; and the whole face of it may undergo a complete change, dependent upon the kind of background against which the tree is cast. All these varied and variable conditions must be considered; and knowing the law of values means to the artist nothing more or less than knowing thoroughly the thousand different moods and phases that nature puts on.

The value of a tone or shade is estimated by its worth or importance as related to other tones or shades, being either high or low, weak or strong. When tones and shades are placed in a picture precisely as they appear in nature, the picture is techni-

cally spoken of as "good" or "true" in values; when the artist fails to produce them as they naturally appear—fails to produce just relationships—his picture is called "weak" in values; and when he chooses to exaggerate them for purposes of artistic effect they are sometimes spoken of as "strong" in values. Of the latter class the portraits of Rembrandt and Goya, and the Eastern pieces of Decamps, are good examples, though you will find writers of high rank, like Hamerton and Fromentin, saying that Goya and Decamps knew nothing whatever of values. As for the second class, the trumpet-blowing angels of Fra Angelico, with their pink-and-white pathetic faces, are instances of where values are "weak," and in the Egyptian wall-paintings they are quite unknown. Of pictures "true" or "good" in values an illustration may be taken from almost any good modern painter, say, Carolus-Duran, John Sargent, W. M. Chase, Carroll Beckwith, or George Inness. These adjectives are sometimes applied to notes of color alone, as indicating their strength or weakness of affinity toward pure white light; but as this is not the generally understood meaning of values I choose to pass it by with a simple mention.

Just precisely how you may decide if the values of a picture be good or bad, weak or strong, I can but imperfectly tell you. I have tried to point out to you what they are, and for the rest you must look at pictures and study nature. Possibly you think you know nature, but you will never know how deep as a well and wide as a barn-door is your ignorance of her until you study art. Look to nature for values, and look to art for the likeness. Generally speaking, their absence from a picture can be noted not only by the lack of shadow gradations, but by the unreal appearance of the whole piece. Devoid of values, a tree, a figure, a table, or a chair may have breadth, but little depth; light, but little shadow. They will appear flat, as though possessed of but one sort of dimension and capable of casting a shadow but one way. That there is air and space behind them would be quite beyond your power of imagination.

If you will pay a visit to the Metropolitan Museum in New York, and make a study of Lerolle's picture of the "Organ Re-

hearsal," you will find that the values in it have been truthfully maintained throughout. Likely some friend will call your attention to the manner in which the figures " stand out " of the canvas, and you will perhaps fancy you see that effect, but Lerolle never painted the picture with that end in view. He, and all other good artists, as Alfred Stevens has observed, strive to make their people " stand in." Notice now how well Lerolle has succeeded in doing this by giving to each object light and shade and gradation. Notice the figure of the girl singing, how perfectly it is developed in atmosphere, and how easy it would be to walk completely around her. Notice also the perfect keeping of the accessory figures and furniture, and while you are looking at the picture be sure to notice that which is only suggested, namely, the vast space of the empty church to the side and in front of the railing. Again, if you will look at any of the landscapes of Corot, Rousseau, or Diaz, and will try to find something more in them than the " splash " and quantity of paint, you will see that the trees are not simply silhouettes cast against the sky, but that they are round, are full of air, light, and shadow, and possess volume and depth.

You do not like them? and you do like this picture of Verboeckhoven, where the sheep preceded by a shepherd are supposed to be going out of a barn? Well, this is quite natural. It is one of the very worst pictures extant. Look at it again. Those sheep will never leave the barn, for they have no more the power of motion than the wooden sheep in the Noah's ark of our youth. They are not thicker than a knife-blade, and even with all their weakness and thinness if they should move they would like enough tumble the barn over, for it is not made of wood but of pasteboard. The shepherd is not inside of the barn, as might be supposed, but is pinned like a paper doll against the blue sky seen through the doorway. If you look out through this doorway you will see that the " artist " intended the picture for a daylight scene, and from that blue sky there must be a sun in the heavens, but where is its effect shown? Where are the lights and shades, the gradations, the perspective, the textures, the qualities, the values? The man, the sheep, the floor, the

sky—in fact, the whole thing is cut out of one flat piece, put together like a stage-setting, and gaudily painted, for what reason more than the making of money I cannot tell. It is unreal and untrue, resembling nothing seen by mortal eye in the heavens above, the earth beneath, or the waters under the earth. I cannot understand how such painters as Verboeckhoven and Meyer von Bremen ever pushed their false and inane productions on the art community as good work. And it is further incomprehensible to me why it is that now, when these men are known to be unworthy as painters, their work is still considered of that kind without a sample of which no gentleman's gallery would be complete. The first man knew nothing of painting; the second knew a trifle more than the first about the mechanical part of his art, but outbalanced any little virtue he possessed in that line by a whimpering sentimentality in his subjects which makes children to laugh, women to cry, and men to grow profane with disgust.

From the sheep picture devoid of values turn to one where they are well maintained, "In the Library," an interior of Meissonier. Mark how well the effect of the light coming in at the window is shown on every thing in and about the room. Note the gradations, the tints, semi-tints, and shadows. Note again the effect of light and shade on velvets, books, tables, carvings, colors. Yet Meissonier is not a great master—that is, he is not one of the demi-gods of art as his admirers would have us believe. He has his failings, but they are usually of a technical nature. He knows the language of art pretty thoroughly, but he does not always know what to say with it—regaring which something will be said further on.—From John C. Van Dyke's "How to Judge of a Picture."

Errors in judging of the degree of illumination on the ground glass are often made when using a yellow screen in orthochromatic photography. A yellow glass will give to a view of a dull, cloudy landscape the appearance of sunshine, and sometimes over-timing is the result.

LATITUDE OF THE PLATE.

THE question of latitude in a plate is one of far more importance than the average student of photography thinks; we often hear some of the better informed photographers remark that the quality of a wet plate negative has never been surpassed by that of the modern dry plate. A few enthusiastic dry plate workers who have never worked the wet plate process often say that there is greater softness and delicacy about a dry plate negative than there is in a wet plate one. They even go so far as to say that the quality of negative produced by a rapid plate is better than that by a slow one; and there are some dry plate workers who are even so ignorant as to say that such and such a plate is as "hard as nails" and lacking in gradation. Those who know better smile at the utter falseness of these statements, which are based upon pure ignorance. No plate is hard; our most delicate transparencies and negatives are often made upon plates having the highest development factor. These few remarks may seem somewhat of a digression from the subject of this article, but the question of the development factor in a plate is more closely bound with that of latitude than at first sight seems apparent. Theoretically, the question might be asked, even of a very experienced scientific photographer, whether a slow plate had more latitude than a quick one, and he would hesitate from a theoretical point of view before answering this question; from a practical one, however, there would be no hesitation in the answer, because within certain limits a certain development factor is necessary for proper printing value, and the slow plate has the enormous advantage of giving this printing density with a minimum of development, and in consequence less actual depth of action in the film by the developer before that printing density is produced. I was led to pen these few lines owing to the immense surprise, to say nothing of the instruction, I received from examining some negatives taken by Mr. Vero C. Driffield, of Hurter & Driffield fame. Mr. Driffield put into my hands a plate with two negatives upon it; he also handed me two prints from these same negatives and asked me what had taken

place. Now while professing to know a thing or two about negatives, I looked upon those he handed to me with very grave doubts in my mind as to how they had been produced, and it needed his explanation to make me understand what he had done. These two negatives being taken on the one plate were developed together for the same time; consequently, the development factor (as those who have had anything to do with the H. & D. system will understand) was the same for both negatives. One negative seemed a perfect one both in exposure and density, but the other looked so dense that it could be scarcely seen through; indeed, it looked a perfectly useless negative to the untrained eye, and yet the development factor, as we said before, was the same in both negatives, the result being that the prints from each negative were identical in every respect as far as the most critical observation of the eye could discern. Mr. Driffield then explained to me that one negative had received one second exposure and the other one-fifty seconds exposure, and yet gave identical prints in every respect, the only difference in the working of these two negatives being that one required an enormous time for printing. Within the period of correct exposure the opacity is proportional to the exposure—(it is necessary here to say by opacity we do not mean density or deposit of silver, which Messrs. Hurter & Driffield say is proportional to the logarithm of the exposure)—consequently, one negative had fifty times the opacity of the other, having had fifty times the exposure. Now what did this mean? It meant that with the exception of a lengthened time of printing, it was perfectly immaterial whether the plate had one second or fifty seconds exposure, and this we must understand without any alteration of the developer or time of development, both negatives being exposed and developed exactly for the same time. Here was a state of things that seemed simply astounding; but upon making a speed curve of this plate the surprise was met by a very simple explanation, which was merely this, that for the developing factor given, the straight line portion of the curve, or correct period of exposure, was so long and embraced such a wide difference of opacity that the limits we could obtain on an "Ordinary" print, say roughly within one to

thirty, could be made with such a plate fifty times over. Of course it is well recognized now that enormous differences can be made in a plate by altering the developer, but the widest limits in practice may be fairly said to be embraced within six to one, and yet we are face to face here with the differences obtained merely by the latitude of a plate of fifty to one. Now, needless to say, this plate was an extremely slow plate, such as would be used for photo-mechanical purposes, well coated and very slow. As we advance in speed we find the practical latitude of the plate fall enormously, until at last, by increasing the speed, we find, within the limits of the range that any printing paper will give, we have no latitude left at all; and the plate must have exact exposure if we are to get a good negative. Now why is this? There is one point which bears very forcibly upon this matter; some time ago in trying to ascertain the effects of time of development upon a plate (especially using a rapid one), I found that in giving one minute of development I obtained with this rapid plate from five to six points within the so-called period of correct exposure. Upon increasing the time of development with the same developer, two, three, four, and five times, there was a corresponding reduction in the number of points within which the straight line of the curve could be kept, and this of course was easy to understand. In a rapid plate we are obliged to develop for a certain time in order to get sufficient density, or rather we should say opacity, of image in order to yield a good print. Now rapid plates for the same developer and time of development have very much less powers of giving opacity, consequently, we are obliged, as it were, to force development for such a time that the action of the developer goes right through the film, with the result that there is not sufficient silver to act upon in order to keep up the regular density factor, giving arithmetical deposits of silver with a geometrical progression of time of exposure. Now with a slow plate with the same developer we reach this printing density when the developer has acted for a very short time on the film, simply because the deposit on a film of fine grain is very much more opaque than that produced on a film with a coarse grain, and it is this ease of getting density on the

slow plates which allows us to practically stop development long before it has reached the same depth of film that would be necessary in the case of a quicker plate. It is really wonderful to note the fall in opacity giving power as the plate is made more and more rapid.

We cannot say that theoretically the latitude is greater in one plate than the other, provided that opacity of image be not taken into account; but for a given opacity the latitude is enormously different in comparison between the slow plate and the quick one. This, therefore, gives us a far greater latitude, to say nothing of better quality, in the slow plate than we have in the fast one. In every case where the term hardness is used to a negative it simply means that the developing factor is too high, and no matter however great the opacity giving powers of a plate may be, this opacity may be made as soft and delicate as we wish by stopping development or modifying the developer, and therefore, considering the fineness of grain in the slow plate, we have the power of making pictures of the greatest delicacy as well as the greatest opacity, whichever we may desire to do. It is not to our interest to decry the value of quick plates; indeed, we, as the pioneers of speed, have no interest in saying a word against fast plates, but we wish to speak justly, and give each kind of plate the merits as well as the demerits it deserves. Therefore, where we want great latitude and fine quality, the slow plate is unquestionably the better one, the question of gradation has nothing to do with the matter at all; provided that we expose the quick plate with the right exposure, and give it the proper development in order to obtain printing density, we shall get a result in actual gradation not inferior to that possessed by the slower plate; but exactness in exposure becomes of great moment in the case of the quicker plate, for we have less latitude, and, therefore, for quick work we require shutters and exposure meters which may be adjusted with absolute exactness. The advantages of high speed are so great in practice that the constant aim of the plate-maker must be to produce the greatest possible density-giving powers in a plate combined with speed. This has always been our strenuous endeavor, and one in which we certainly have been successful.

At the same time the fact still remains that without alteration of development a very slow photo-mechanical plate can be made having quite easily a range of fifty to one, whereas some of our very highest speeds we have obtained will only give a latitude of one to one and a quarter, and by still further decreasing the speed we may even make the range of the negative less, in striving for a given printing density, than the range obtained upon the print. As soon as the range of a plate equals that of the print, latitude is nought; and if we fall below this it is impossible to give a correct rendering of any subject embracing the total range of printing papers. I can assure my readers that already some rapid plates in the market have fallen below this range, and it means that such plates possess no latitude whatever, and are even incapable of representing the range obtained in printing papers. The plate-maker must never let his plate fall below this point, and even if he approach it the difficulty of getting a god negative is far greater for want of that valuable latitude.

—J. C., in " Dry Plates."

DEPTH OF DEFINITION.

THERE is no need to point out what " depth of definition " is, for the term is self-explanatory, but the reason for using this term rather than " depth of focus " is worth a word or two. An image that is markedly out of focus may yet present good definition, that is, a definition sufficient for the subject. Indeed, an out-of-focus image may be better for a subject than a sharp image, or, at least, it may be more desirable from some worker's point of view, and it would not be right, for it would be a misuse of words, to say that there was no definition merely because the image was out of focus. Definition is a relative while focus is an absolute term. Definition may be impaired, it may be bad, but if an image is not in focus it is out of focus; there are no degrees of focus, though, of course, there are degrees as to the distance from the focus. When photographers use the word focus in this connection they mean definition, and it is much better to use the word that expresses the meaning than to misuse a word and hope that it will be understood as intended.

It has often been stated that there is no such thing as depth of focus. Theoretically with a perfect lens there is not, but practically there is, unless, indeed, we rob the word focus altogether of practical meaning and make it to signify an absolute point which, of course, is non-existent, except, perhaps, in the imagination. If light issuing from a point not too near a lens were to fall upon a perfect lens, that is, one that is perfectly free from all aberrations, the lines marking the boundaries of the beam would approach to a point and diverge again. But these theoretical conditions canot be realized, and with the best of lenses the beam, instead of converging to a mathematical point, converges to a blunt point, and, therefore, there is a certain distance over which the screen that receives the image may be moved without impairing the definition. This distance is appreciable in large lenses, but in using small lenses, though it may be proportionately as great, it may be hardly recognizable without special means. This is " depth of focus," because the focus, so far as the lens

gives a focus, is not in a plane, but extends a little on each side of it.

To estimate depth of definition a standard of definition must be settled upon, and this standard is generally, though not always, expressed as the maximum diameter of the "disc of confusion," which is the disc of light produced instead of what ought to be a point. Now considering only a perfect lens and the image produced by it in the middle of its field, that is, its axial defining power, it is obvious that depth of definition will depend only upon the focal length and aperture of the lens. This has led some to say that depth of definition can be calculated from these data, that it is useless to experimentally estimate it on this account, and that it is independent of the quality of he lens if the lens is properly made, and these ideas have been urged to correct the common notion that depth of definition is a quality varying in different lenses which possess the same aperture and focal length. Everyone must allow that for practical photographic purposes depth of definition is a desirable quality, except only in copying from the flat, and it is important to know, therefore, whether it is a property that can be increased by superior construction or whether it depends solely on focal length and aperture whatever the construction. We venture to assert that the common notion that depth of definition is affected by the construction of the lens and not merely by aperture and focal length is correct, not only theoretically, but practically and appreciably. At the same time we do not say that there was no justification for urging the other view, because probably the extent to which depth of definition could be controlled in the construction of the lens before the introduction of anastigmats was much overrated by some photographers. But depth of definition was not at any time governed only and solely by aperture and focal length.

Of course, we write here as photographers and for photographers, and photographers require their lenses to cover an appreciable field, and to regard only the middle of the field, say a disc of two inches in diameter in the middle of a whole plate, is of no practical use. But depth of definition in the middle of the

field is not governed only by aperture and focal length even with the older lenses, though probably for most practical purposes the idea that it is is a sufficient approximation to the truth. The measurement of depth of definition by taking the diameter of the disc of confusion is a valid method only when the disc of confusion is equally illuminated, and the disc of confusion practically speaking never is equally illuminated. It is obvious that if the out-of-focus image of a point (for that is what the disc of confusion is) is a disc with a bright centre, definition will be better than if it is a disc of the same diameter and equally illuminated. When spherical aberration is introduced in a careful manner, as by screwing back the posterior element of the portrait lens introduced by J. H. Dalmleyer, then the disc of confusion on one side of the focus is made smaller, on the other side it is enlarged; but there is a concentration of light at its centre; here, therefore, there are conditions that tend to increase the depth of definition.

But when we leave the middle of the field the case is widely different. Here the older lenses of the same type even, and of the same aperture and focal length, show widely different depths of definition. And the photographer must cover his plate, or so much of it as he wishes to; it is useless for him to regard only a very small area in the middle of it. We must, therefore, in all these cases consider the whole area of the image. Perhaps the best practical rough and ready guide for getting an idea of the depth of definition of different lenses under different conditions is to consider that it depends on aperture, focal length, and covering power. There is no method by which the amount of depth of definition can be determined with accuracy, though, of course, it can be estimated in a sufficiently useful manner for practical purposes. The measurement of the disc of confusion is impossible with any lens, because the image of a point at the margin of the field of the lens is never circular, and probably never equally illuminated over its area. Other methods of estimating defining power are only rough and approximate, though they may be, and sometimes are, quite sufficient for general practical purposes. If we adopt a standard of minimum defining power applicable over the whole field, and determine the position of the screen or sensi-

tive surface where this minimum definition is given both inside and outside the focal plane, plot these points in their proper relative positions on a sheet of paper, and join them to get a drawing of the line within and the line without the focal plane where this standard minimum defining power is situated, the distance between these two lines will show the depth of definition at any part of the field. The whole space included between these two lines is sometimes called the "focal volume," but it would be more correct to call it the "definition volume," as it is a matter of definition and not of focus. This definition volume as a whole represents the depth of definition of the lens as a whole, and any part of it will show the depth of definition at that part of the field. Now if such diagrams are drawn, say, for an ordinary rapid doublet and for a modern flat field lens that is practically free from astigmatism, in the first case both lines will probably be curved, and they will rapidly approach each other towards the margins of the field; in the second both lines will be straight and parallel for an appreciable and in some cases for a considerable distance, after which they will approach each other. If the lenses are of the same focal length and aperture, the distance between the two lines will probably be about the same in both cases in the centre of the field, but at a distance from it the modern lens may show ten times more depth of definition than the other. To tell a photographer that these lenses have the same depth of definition is to say what is not true, though they may have the same depth of definition in the middle of the field, and very great differences of depth of definition will be found between lenses of the old kinds, although their apertures and focal lengths may be identical. There has been too much tendency in the past to assume theoretical conditions that do not exist, and to apply to the whole what belongs only to a part.—"Photography."

INTERNATIONAL EXHIBITION OF PHOTOGRAPHY —ROYAL SOCIETY OF GREAT BRITAIN.

THE Royal Society of Great Britain will hold in the spring of next year an international exhibition of photography in the famous Crystal Palace, Sydenham, London.

It is proposed to devote the entire nave of the Crystal Palace, together with such other spaces as may be necessary. The arrangements have been placed in the hands of a committee, of which Captain Abney, Sir Truman Wood, and other eminent men are members. The exhibition will be formally opened on Wednesday, April 27th, 1898, and continue until Saturday, May 14th, following.

Various branches and applications of photography will be fully represented, including exhibitions of historical photography, which, among other things, will show a complete Deguerreotype studio in full operation; a complete series of the various forms of lenses with diagrams, etc., of construction, and specimens of work done with each.

It is requested that possessors of apparatus or pictures (negative or positive) of historic interest will communicate with the committee. No charge will be made for exhibits under this head, and the committee are prepared to pay all expenses of transportation of objects accepted.

Portraiture and general photography is open to all photographers, and it is hoped that many portraitists will exhibit in a large scale in this section, to which a very important space is devoted.

It will include:

1. Examples of portraiture, landscape, and architectural work.

2. Specimens of photography produced under exceptional difficulties, or by means of special apparatus.

3. Transparencies, lantern slides, and enlargements.

4. Ceramic photographs and enamels.

5. Illustrations of processes of every kind, including Diazotype, ferro-prussiate and kindred processes for copying drawings, etc.

6. Demonstrations of various photographic processes.

7. Models of studios, methods of glazing, studio accessories, etc.

8. Photography by artificial light.

9. Methods of printing photographs rapidly and in quantity.

In the section of Apparatus and Material, manufacturers and dealers are specially invited to exhibit. A plan of the area assigned to it will be prepared, and can be obtained at the Society's offices, showing the method of subdivision.

It is anticipated that this section will include:

1. Apparatus and appliances of every sort used in the production and display of photographs: plates, papers, chemicals, apparatus for coating plates and paper, etc.

2. Machinery in motion showing the various processes employed in the manufacture of lenses, cameras, etc.

3. Illustrations of the work produced by the apparatus and materials shown.

4. Animated photographs and apparatus for their display.

The section of Photography in Colors, will comprise color photography and apparatus for producing and seeing color photographs, by whatever method produced.

Pictorial photography. A loan collection will be arranged, with a view to display the present position of pictorial photography.

The section of Photo-mechanical Processes, will comprise all exhibits relating to the processes classed as photo-mechanical, e.g., photogravure (intaglio), line and half-tone photo-engraving, collotype, photo-lithography, photo-zincography, Woodburytype, etc. A plan of the area assigned to it will be prepared, and can be obtained at the Society's offices, showing the method of subdivision.

It will also include examples of letter-press printing which includes half-tone work, journals and books produced partially by photography, drawings made with a special regard to their being reproduced photographically, textile and paper-staining processes, and photo-mechanical three-color printing processes.

It is hoped that as many as possible of the processes will be actually shown in operation.

In the section of Scientific Applications of Photography, will be included the various scientific uses to which photography is put.

It is expected that among other exhibits will be

1. Photo-micrographic apparatus of the latest designs, photomicrographs, micro-photographs, etc.

2. Astronomical photography. The complete mounting for one of the instruments now employed in mapping the heavens. Space will be placed at the disposal of the leading observatories in the world.

3. Photographic recording instruments and photographic records.

4. Military photography (including the photography of projectiles, photographic surveying, and balloon photographs).

5. Engineering photography.

6. Medical photography, including photography with the X-rays.

7. Subterranean photography.

8. Meteorological photography. (Clouds, lightning, etc.).

9. Spectroscopic photography.

10. Instantaneous photography applied to the movements of animals, and to the phenomena of rapid movement, etc.

11. Composite photography.

12. Geological photography.

13. Metallurgical photography.

In the section of Photography as a Science, will be included examples of results obtained by different experimenters in carrying out scientific investigations connected with photography, e.g., examples illustrative of chemical and physical processes and investigations bearing on photography; experimental plates and apparatus employed in devising the various systems of plate speed measurement; a similar collection with reference to the production of orthochromatic plates, etc.

The committee request that the possessors of any object of interest coming under this heading will communicate with them. There will be no charge made for exhibits in this section, and

the committee are prepared to pay all expenses of carriage on objects accepted by them for exhibition.

It will be seen that the charges to exhibitors are of a very moderate character, being fixed solely with the view to defraying necessary expenses of organization; the exhibition being conducted solely with the idea to the advancement of photography.

Everyone at all interested in the delightful art should aid in making this international exhibition the largest and most complete of its kind that has ever been held.

As the exhibition does not open until next spring, our readers will have ample time to avail themselves of the opportunity of contributing to the grand enterprise of the Royal Society, and make a creditable display for our country.

American exhibitors have always met with kind reception in England, and have received commendation for the merits of their displays.

The Society is especially anxious for exhibits of interest, historically and scientifically.

Mr. R. Child Bayley, the assistant secretary, has kindly sent us a number of prospectuses, and directions and exhibits, which we will be pleased to forward to any desiring them.

All communications should be addressed as follows: The Secretary, Royal Photographic Society, 12 Hanover Square, London, W., England.

The usefulness of the Ray Filter is never more clearly apparent than in photographing autumn landscapes. Every disciple of the camera has doubtless had the disappointment of selecting a particularly charming bit of scenery which, in itself, might not be particularly attractive, but to which the tints of the autumn leaves have added an irresistible charm, and when the exposed plates are developed, finding that all the life of the original was lost, owing to the lack of proper preservation of color values, halation in the distance, and over-exposure of the sky. The use of the Bichromate of Potash Ray Filter will obviate these difficulties and render the same contrast in the negative as is observable in the original landscape.

P. A. OF P.

Altoona, Pa., September 2d, 1897.

THE Executive Board of the P. A. of P. in session. Members present, G. Taylor Griffin, E. E. Seavey, E. H. Newell, W. I. Goldman, and T. B. Clark. The following changes were made from last year. It was decided to hold the next annual meeting on February 23d, 24th, and 25th, 1898.

The Board then took up the matter of hall for place of next meeting, and this is where the Board found a very unexpected disappointment. The City of Altoona offered no facilities in the matter of hall. Thereupon the Board was compelled to change the place of meeting, with much regret. The City of Johnstown was suggested, whereupon the Board adjourned to Johnstown, after a canvass of the city.

The Board encountered more difficulties of like character. A proposition was made to come to Bellefonte, and after a short delay in the matter it was decided to meet at Bellefonte. The large and spacious Armory of Company B, Fifth Regiment, N. G. P., was secured. Much credit is due Mr. H. B. Shaeffer, of Bellefonte, for his active interest and co-operation in securing this large and commodious hall, heat and rent free to the Association.

Bellefonte is one of the noted inland towns of this State. Picturesque in its location, nestling at the base of the Alleghanies, it is appropriately named the "Mountain City," and like classic Rome is built on "seven hills." It is famous for the homes of Governors Curtin, Beaver, and Hastings. It has a wonderful spring, from which it derived its name, Bellefonte (Beautiful Fount).

In conclusion, let me say that this meeting place will be most interesting, and the Association will reap the benefit—financially —by the change.

The prize list is as follows:

Special Class.—To photographers outside the State of Pennsylvania. One portrait only. No restrictions to size. First, gold medal; second, silver medal.

Grand Prize.—Six portraits only, sixteen inches or larger.

Class A.—Six portraits only, thirteen inches or larger. First, gold medal; second, silver medal; third, bronze medal.

Class B.—Six portraits only, thirteen inches or larger. First, gold medal; second, silver medal; third, bronze medal. Open to towns of fifteen thousand or under.

Class C.—Twelve portraits only. No restrictions as to size. First, silver medal; second, bronze medal; third, diploma. Open to towns of five thousand or under.

Class D.—Interiors or exteriors. No restrictions to size. Eight pictures only. First, silver medal; second, bronze medal; third, diploma.

Class E.—Commercial. Eight pictures only, nine inches or larger. First, silver medal; second, bronze medal; third, diploma.

Class F.—Amateur class, open to the world. Six pictures only, 4x5 or larger. First, silver medal; second, bronze medal; third, diploma.

Rules governing the entries will be furnished in due time.

The Board extends a cordial invitation to photographers, both professional and amateur, manufacturers and dealers, one and all, to meet with us, and thereby assist in upbuilding and elevating our beautiful art to the station to which it rightfully belongs.

T. B. Clark, Secretary, Indiana, Pa.

Bridgeport, Conn., August 26th, 1897.

Editor "American Journal of Photography :

The twentieth Free Art Exhibition will be held in the galleries of the Bridgport (Conn.) Public Library from October 16th to November 27th, and will include a special section for a display of photographs taken by cyclists awheel.

Contributions of photographs framed, or simply mounted, are asked from all wheelmen. Exhibits will be returned promptly without expense to the exhibitor. Address W. J. Hills, Superintendent.

SOME OBSCURE PHOTOGRAPHIC PHENOMENA.

(Continued from last issue.)

A PIECE of polished zinc was coated with copal varnish with the object of ascertaining whether the action would take place through such a medium, and in case it did, as it was thought at the time, of demonstrating that the action could not arise from metal vapor. The experiment was quite successful; the photographic plate, notwithstanding the varnish, was strongly acted on. The experiment was repeated several times, and always with the same result; but the pictures seemed rather too good, darker than those given by the zinc alone, and on trying the copal on plain glass instead of on zinc it proved that effects apparently similar to those obtained with zinc were produced. What is known as picture copal answers very well for these experiments. That prepared by Winsor & Newton has been used. This is painted or poured on a clean warm glass plate, and allowed to harden completely. The plate can then be used in the same way as the zinc plates. If a photographic plate be laid on the hardened varnish for two to seven days, a picture of the varnish, showing the streaks it happens to have dried in, is produced. If screens be interposed so as to prevent contact between the copal and the plate, the action still occurs, and, in fact, readily passes down a tube one inch long. Therefore, as with the zinc, any figure cut out in an inactive screen is readily produced on the photographic plate. Substances which are transparent or opaque to the action of the metals seem to act in the same way towards copal. It is rather more active than zinc. Glass is perfectly impervious to its action, but celluloid, gutta-percha tissue, and gelatine it permeates more readily than zinc does. The activity of the copal varies considerably under different conditions. If gum be sprinkled on a glass plate and then fused, it is not so active as when picture varnish is used. If the solid gum be dissolved in pure alcohol and ether, and applied to a glass plate as before described, it is far more active than after fusion. Heating it in a water-bath deprives it of a considerable amount of its activity; but this can be revived by wetting it with ether and allow-

ing it again to dry at ordinary temperatures. As with zinc, increase of temperature increases its activity to a great extent. Experiments similar to those with zinc were made with copal. A coated glass was exposed to a heat of about 70 degrees, and a similar one was kept at 0 degree. This one after five hours gave only a faint picture, whereas the heated one gave a dark picture, and a considerable amount of action took place even through the cardboard screen. Many other bodies of the same nature as copal act in the same way. This has been proved to be the case with Damar and with Canada balsam, but copal seems to be the best representative of the class. Certain gums, such as gum arabic, gum senegal, have not the property of acting in this way. There are, however, a large number of bodies which have the power of acting in a manner similar to the copal; one of these is wood, and it possesses a very considerable amount of activity. Any ordinary smooth piece of wood laid on a photographic plate will act like zinc in impressing its picture on the plate.

A section of a young larch tree gave a good picture, showing clearly the different rings and the layer of bark, which was the darkest part of the picture. The same section, when a film of gelatine was interposed between it and the plate, still gave a good picture. Wood which is thoroughly dried and hardened is also able to act in the same way.

A piece of mahogany 3.5mm. thick, which had been in this form for at least thirty-five years and been carefully preserved in a dark cupboard, gave after a week's exposure a good picture, and the bottom of an old cigar-box acted equally well. Bodies such as straw, hay, bamboo, oiled silk, and, no doubt, many others, act in the same way. If wood, however, be painted with melted paraffin, it is no longer active. Ordinary charcoal also depicts itself on a photographic plate, but if it be heated for some hours in a covered crucible it loses this property. An ordinary piece of wood, if it be charred on one side by heating it with a Bunsen lamp, becomes remarkably active, as shown by placing it behind a screen with a pattern cut out. The action passes readily through different media, such as gelatine tracing-paper, etc., vegetable parchment, etc., and the structure of the charcoal is shown, when the action has taken place, even through

a sheet of vegetable parchment. Coal and coke, sulphur, sugar, on the other hand, exert no action of this kind. When trying whether a copy of a lithographic picture could be obtained by placing behind it a plate of zinc, some curious results occurred. It would seem that printer's ink in most cases is not capable of acting, like copal, on a photographic plate, but that there are many cases in which it is a remarkably active substance. Specially so is the ink used in printing many of the newspapers. The "Westminster Gazette," for instance, is printed with an ink which very readily acts on a photographic plate. A portion of this paper with printing on only one side, laid with the blank side on the photographic plate, in a few days gives a remarkably black and distinct picture. If there be printing on both sides, then two pictures are obtained, the darker printing becoming most evident on whichever side it may be. Interpose a sheet, for instance, of gold-beater's skin, and still the picture is obtained. The "Standard" and "Daily Graphic" are also very active, and the "Times" only a little less so. The "Evening News" is only slightly active, and the "Morning Post," "Pall Mall," "Echo," and "Daily News" have not the property of acting in this way; at least, those copies experimented with had not. An admission ticket to the Society of Arts laid on a photographic plate, the ink away from the plate, also gave a very distinct picture.

Another singular case of an action of this kind was met with when experimenting with the uranium salts. Not having a sufficient number of small clear glass bottles for a certain set of experiments, one of the compounds, the black oxide, was placed in a pill-box, believing that the action of the uranium would take place through the bottom of the box, and on developing the plate a dark circular space where it had stood was visible. The experiment was therefore considered very satisfactory, and, with different salts and for different objects, it was several times repeated. Ultimately it was forced upon one that the uranium salts acted more strongly when in pill-boxes than in any other way, and on placing a pill-box without any uranium salt in it on a photographic salt it was found that action had occurred, as shown by the dark circular space produced.

The experiment was repeated over and over again, with the result that most pill-boxes have the power of acting on a photo-

graphic plate. Both new and old pill-boxes from different sources were experimented with, and almost all of them found to be active. There are, however, exceptions, and these, it was noticed, were always the more expensive and elaborate boxes. On examining the structure of a pill-box it was found that it is usually made of what is known as strawboard, covered with a thin white paper; on separately testing these two materials it was apparent that the white paper was without action on the plate, and that the strawboard was very active, and produced exactly similar effects to those produced by the active pill-boxes. The inactive ones proved to be made of white cardboard, which is not an active substance. Samples of strawboard from several different sources have been tried, and all found to be active, and when separated from the photographic plate by means of screens, like the copal and the zinc, it gives a clear action. Different substances of a like nature have been tried, such as brown paper, etc. Some of them are more or less active, but none more so than common strawboard. Mr. Bevan was good enough to examine a piece of this active strawboard, but was unable to find any material other than straw present. Writing paper, and, as mentioned before, white cardboard, have not this power of acting on a photographic plate, but many kinds of brown paper, and, no doubt, many other bodies, have the property. Many of the boxes in which photographic plates are packed are made of strawboard, but as the action does not pass through glass the plates are but little or not at all acted upon; but if a plate be laid face upwards in one of these boxes and left there for a week, it will be very appreciably affected. If a small piece of glass be laid on the plate it protects the film beneath, and shows clearly the amount of action which has occurred. If a box of this kind be painted inside with melted paraffin, this action does not take place. It happened that a few months before making the above experiments others were in progress in which black net was placed on a photographic plate simply to show clearly whether the plate had been acted on, and continually a reversed picture was obtained; this at the time could not be accounted for, but now the experiment was made of simply placing the black net on the photographic plate and leaving it there for some days; then, on development, a clear picture of the net was produced. The action is due to some material in the black dye, for white net does not act in the same way.

The action of the vapor from a few liquids on a sensitive plate has been tried. The plate was placed about half an inch above the liquid, and a screen, with holes cut in it, was fastened against the plate. Methylated spirit acted slightly on the plate; pure alcohol and ether had no action; benzene, coal-tar, crude wood spirit and linseed oil, also had no action, but turpentine and oil of cloves produced a slight amount of action.

Such, in outline, is an account of the experiments which have already been made on this subject. One point has led on to another, and some of the results were so unexpected that the experiments had to be repeated many times before full credence could be given to them. On the present occasion it is desired to do little more than record facts; further experiments, it is hoped, may lead to explanations not now evident. The supposition that all these active substances, the metals as well as organic bodies, give off a vapor capable of acting on a photographic plate, naturally suggests itself, and that copal does give off a vapor which, directly or indirectly, is active, there can be no doubt. At the same time, it is at least difficult to suppose that the activity of such a body as strawboard should, after the treatment it has undergone, give off, at ordinary temperatures, sufficient vapor to produce the effects described, and the same applies to old dry wood, etc. Still more interest attaches to the action of the meals. Do they emit a vapor so delicate in constitution, and in such a quantity, that it can readily permeate celluloid, gelatine, etc., and produce a picture of the surface from whence it came, or is it a form of energy (possibly what has been called dark light) that these bodies emit? Zinc kept and polished in the dark loses none of its activity. An experiment has been made with the object of reflecting the zinc action from glass. This did not succeed. Whether this arose from the glass not being capable of effecting such a reflection, or whether a fortnight was not sufficient time to produce in this way a visible effect, is not known, but the experiment is being repeated.

A photographic plate, suspended film upwards, over a copal plate, was acted on round the edges in the way one would imagine a vapor to act. A similar experiment is being made over a zinc plate. The action of glass proves that there is at least a marked difference between the action exerted by metallic uranium and that by zinc and other metals.

It should be stated that it is only the most sensitive photographic plates which, without extremely long exposures, give the results described. The Mawson plate has generally been used in the foregoing experiments, but the Ilford special rapid plate acts equally well, and Edwards's isochromatic snap-shot plates are peculiarly sensitive to the action of the uranium salts. Lumiere's extra rapid are not so sensitive as the Mawson and Ilford plates, and still less sensitive are the same firm's plates for yellow and green, and for red and yellow. Other sensitive plates have not been experimented with.

INTENSIFICATION SCREENS FOR X-RAYS.

Starting with the assumption that the Roentgen rays do not act directly on the bromide of silver, but must first be converted by the gelatine or the glass into fluorescent light in order to be photographically active, it naturally follows that an intensification of the photographic action must ensue if the rays are converted into fluorescent light immediately in contact with the film. This was proved in April, 1896, by placing a screen of paper covered with platino-cyanide of barium in contact with the film. Although this action was recognized, yet it has found but little use in practice, but now such screens can be obtained commercially. One disadvantage of these screens is in the granularity of the film, since the platino-cyanide of barium only fluoresces when it has a particular crystalline form. The chemical factory of C. A. Kahlbaum, of Berlin, has now placed screens very evenly and thinly coated with a fine-grained platino-cyanide, which give excellent results, but, of course, the platinum salt is still very high in price.

It is, therefore, advisable to try and find a cheaper material which shall be equal to platino-cyanide. Edison was the first to suggest a cheaper salt, the calcium tungstate, and in its native form of Scheelite it is an approximate substitute for the platino-cyanide. The Allgemeine Electricitäts Gesellschaft, of Berlin, have placed on the market a screen prepared with this salt, and although the fluorescence of this screen is less than that of the other visually, it still increases the photographic action, and, since it fluoresces with a bluish-white light, ordinary dry plates may be used with it, whilst for the platino-cyanide, which fluoresces with a yellowish-green color, erythrosine silver plates must be used. The grain of the tungstate screen is very prominent.

Lately Kahlbaum & Co. have introduced a tungstate screen, which not only possesses far greater fluorescent properties than the old form, but possesses scarcely any grain, an important point as regards the definition of the image.—" British Journal of Photography."

SOME RECENT X-RAY INVESTIGATIONS

Mr. A. A. Campbell Swinton, in an interesting paper on the above subject, read before the London Camera Club, in speaking of the practical application of the X-rays to surgical and other purposes, emphasizes the great advantage derived from using large electrical power by means of a mercury contact-breaker, the chief advantage of which is that one is enabled to make and break contact very quickly, securing more energy in the secondary coil than by the ordinary arrangement. The writer deplores the fact that no improvement has been made in special X-ray plates. Those claiming superiority for sensitiveness to the rays are not a bit better than ordinary plates.

Various people have experimented with fluorescent substances used as a screen placed in contact with the photographic film, or mixed with the sensitive emulsion. These arrangements, however, have one fatal disadvantage: the exposure is undoubtedly reduced to a considerable extent, but the picture is largely destroyed by reason of the great granularity which is produced, and by the loss of the marvellous definition which is secured by the use of the focus tube. Very little of the energy of the X-rays is absorbed by a single thickness of film, and, of course, if the film does not absorb the energy, it is quite obvious that the energy is not being utilized to the best advantage.

The now generally accepted theory with regard to the origin of the X-rays is this: The rays which proceed from the cathode consist of particles of the residual gas in the tube, which, being similarly electrified to the cathode with which they are in contact, are repelled at a great velocity —about half the velocity of light—rectilinearly and at right-angles to the surface of the cathode; and these particles of gas, hitting the anti-cathode, give rise to non-periodic shocks in the ether, which shocks are X-rays. That is the most approved theory of the X-rays, and is due to Sir Gabriel Stokes, than whom no more competent authority could be found. There are several difficulties with regard to the theory of the X-rays, one of them being that the rays are not propagated from the surface of the anti-cathode exactly in the same way as light is propagated. Sir Gabriel Stokes has brought forward this idea of a shock to the ether as a theory that will account for everything.

It has been supposed that the cone of cathode rays is solid, but Mr. Swinton showed that the energy of the discharge is not uniform throughout the section of the cone, but is confined almost entirely to the outer surface. When a carbon surface is placed for the cathode rays to focus upon, and we have the means of adjusting the carbon at any desired distance from the cathode, we are enabled to investigate the section of the cone of cathode rays at different points, and to determine that this cone,

so far as its energy is concerned, is hollow. The writer further found that the cathode rays cross at the focus instead of diverging, and at a fairly high vacuum they come entirely from the centre, so that it is a mistake to employ large cathodes.

Mr. Swinton tried a number of experiments with different kinds of tubes, and sought to arrive at some way of regulating the tube to maintain exactly the right vacuum, the platinum having a tendency to occlude the residual gas, and eventually the resistance becoming so high that it is impossible to get any charge through at all.

Among other things, he ascertained that the effect of suitably placing a powerful magnet near the tube was to enormously decrease the resistance, the alternative spark being reduced from 1½ inches to about ⅛ of an inch; besides the rays are focussed so that the glass becomes red-hot and cracks, unless the current is switched off immediately.

Mr. Swinton devised a tube in which the rays were not received upon the glass, but upon an inclined plate of platinum, just as they are in the focus tube, only employing a flat cathode, relying on the magnet to focus the rays upon the platinum.

With such a tube, increasing the power of the magnet has the same effect as decreasing the vacuum, and vice versa, but in practice he finds this form of control is not very easy to manage, and has made other forms of adjustable tubes which work much better.

Though there is a necessity for the best results to use high electrical power, it will be found that the tubes do not survive the strain. To obviate the difficulty modified forms of tubes are had recourse to.

Mr. Swinton showed a tube, in which the platinum is mounted on a block of aluminum about an inch in diameter and quarter of an inch thick. The specific heat of aluminum being very high, and its mass and radiating surface considerable, it will absorb the heat for a long time, and prevent the platinum from getting too hot, so that the resistance of the tube is not varied to any great extent.

A large number of experiments were tried with different materials for the anti-cathode, including platinum, copper, iron, bismuth, carbon, aluminum, and silver, and the interesting fact was discovered that so far as the penetrative value of the X-rays produced is concerned, it does not matter what the material is, but as regards brightness of the screen, the quantity of the X-rays, as distinct from their penetrative value, it matters very considerably, platinum being the best of materials in this respect. As regards the sizes of the cathodes, tubes with very small cathodes require much lower exhaustion, in order to arrive at any particular penetrative value of the rays, than tubes with large cathodes.

The nearer the anti-cathode is to the cathode, the more penetrative are the rays, and with this tube the rays may be made of any desired penetra-

tive value, within limits without altering the vacuum, and of course it allows the adjustment to suit the vacuum existing in the tube.

Mr. Swinton has recently described (see "Nature," May 27th, 1897) an improved form of adjustable tube in which the adjustment is effected by slightly altering the position of the cathode relatively to the glass walls of the bulb. The cathode is arranged upon a sliding support, so that it can be moved to the extent of about .3 inch in and out of a conical tubular neck blown on one end of the bulb, and by simply altering its position between its extreme limits of travel every grade of penetrative value tube has other practical advantages over those described above.

Mr. Swinton replied to some of the remarks made in the course of the brief discussion. He said most of his recent experiments had been made is readily obtained. The point of origin of the X-rays is fixed, and this with a fluorescent screen, and not with photography, and he had found that the greater the power that was applied the brighter did the screen become, and the results were altogether better. He used a 10-inch coil, and by putting a mercury contact-breaker on to it the primary power used was about 12 volts, 15 amperes, and it produced better results than a smaller coil.

He thought the penetrative value, but not the quantity of the X-rays, depended on the potential. He had never tried fluorescent anti-cathodes, but found sometime ago that phosphorescent anti-cathodes did not give a good result. The screen he used was sold as a barium platino-cyanide screen. He had certainly found that increasing the power improved the results, but the improvement was not proportional to the increase of power. With regard to the possibility of taking radiographs with short exposures, he had intended to have mentioned that he had with him a series of photographs of a frog's leg, taken by Dr. McIntyre with a kinematograph. He did not know exactly how this was done, but Dr. McIntyre had taken radiographs of the hand with a single break of the contact-breaker, which must be measured in millionths of a second, and he was no doubt working with the idea of showing the human form, in the kinetescope, as a skeleton walking about. With reference to the chairman's question as to the adjustment of the tubes for half-hour exposures, Mr. Swinton thought the reply was that half-hour exposures were unnecessary. He had made radiographs of all portions of the human body, and thought he had never given an exposure of more than about ten minutes. The tube could not be adjusted while the exposure was in progress, but must be set to give an average result throughout the whole period, so as to be, perhaps, a little too high to begin with, and a little too low at the end. He had observed the difficulty of getting defined pictures of bones through great thicknesses of flesh, and it was apparently due to some form of diffusion in the flesh. In doing the spine or ribs the bone was a

very small proportion of the total density; it was a matter of getting the tube to exactly the right condition, and the object of the adjustable tubes was to facilitate the obtaining of the necessary condition. There was no doubt that the X-rays had considerable effect in some cases upon persons' skins, and he had recently been in communication with a gentleman who had had his head radiographed in his laboratory, and who alleged that he had now become entirely bald on one side of the head, and that he had nearly lost the use of one eye and one ear. These severe effects, however, appeared to depend upon personal idiosyncrasy, and neither he nor any of his assistants had experienced them.

NOTES.

H. Vollenbruch suggests a modification of Eder's ammonia silver oxide method for the preparation of orthochromatic dry plates.

A

Water,	1,800 c.c.
Heinrich's soft gelatine,	100 gr.
Bromide of Ammonium,	118 gr.
Oxymethyl sulphovinate of soda,	6 gr.
Iodide of potassium solution (1 : water),	16 gr.

B

Silver nitrate,	180 gr.
Distilled water,	1,200 c.c.

Add ammonia drop by drop until the precipitate first formed is redissolved.

The gelatine solution is warmed up to 60 degrees C., and mixed with the warm silver solution and allowed to digest in a warm water bath for an hour, at the end of which time the water should not be less than 48 degrees C.

The Emulsion is put in a clean porcelain dish and allowed to set ; broken up into small fragments which are washed in a canvas bag in the usual manner, melted and separated from any sediment found at the bottom of the tall glass in which it has been allowed to cool.

Next soak 240 gr. of soft and 50 gr. hard gelatine in two or three changes of distilled water for half an hour ; press it well from the water and add to the bromide of silver solution ; re-melt and bring the bulk up to 4½ litres of emulsion ; filter and put in an ice chest for two days to ripen.

Re-melt and add 80 c.c. of the coloring solution VI. (see Eder's formulæ) ; filter, and the emulsion is ready for flowing upon the plates.

The plates so prepared are not extremely sensitive but render color values excellently.

THE TRANSMISSION OF LIGHT THROUGH SPACE.

An experiment has recently been made in America by Francke L. Woodward, which, if confirmed by other experimenters, will revolutionize all our ideas of the transmission of light through space. Woodward's experiment seems to indicate that light in its ordinary terrestrial form cannot be transmitted through a vacuum. An exhausted glass bulb was covered with black paper in which three circular openings were cut, two at opposite ends of a diameter, and the third one at one end of a diameter at right angles to the first. A beam of limelight was sent across the vacuum bulb through the first two openings. On viewing the interior of the bulb through the third opening, the beam, in crossing the interior vacuum, was almost imperceptible. The intensity of the light issuing from the second opening was not one-twentieth of that entering by the first opening, and the more perfect the vacuum, the less was the intensity of the light issuing from the second opening. If, now, a powerfully excited Crookes' tube is focussed on the bulb when the same experiment is performed, it will be found that the beam of light emerging at the second opening will have almost the same intensity as when it enters at the first. When the experiment was repeated with tubes of different degrees of exhaustion, it was found the intensity of the emerging beam of light was inversely as the degree of exhaustion, except when the Roentgen rays were focussed upon the vacuum tube. Woodward thinks that this supports Tesla's theory that the Roentgen rays consist of a stream of material particles capable of passing through the glass walls of the bulb. When these particles enter the bulb the transmission of light is facilitated. It would follow from this that light can only be transmitted when material particles as well as ether are present. Woodward gets over the difficulty of transmitting light through empty space, as for example from the sun to the earth's atmosphere, by supposing that the radiant energy is projected from the sun in the form of cathode rays which, when they impinge against our atmosphere, are converted into ordinary light. It must be admitted that we have no right to assume that light as we examine it in our laboratories has the same form throughout the presumably empty space between the sun and our atmosphere. This altogether unjustifiable assumption has hitherto been made by physicists no doubt as being the most probable view to adopt ; but in case the Woodward experiment is confirmed, and a vacuum is proved to be opaque to ordinary light, our theories of the transmission of light through space will have to be changed. There are astronomical and meteorological phenomena which support the theory of the existence of a cathode stream from the sun. According to the theory of comets which is now most in favor, tails of comets are due to a cathode stream such as Crookes found to proceed

from an obstruction placed in the main cathode stream. The aurora borealis has also been explained by Birkeland in a very satisfactory way on the assumption that it consists of cathode streams in the upper regions of the atmosphere, directed and controlled by the earth's magnetism. The cathode ray theory of the transmission of light will have many difficulties to meet, but it deserves to be thoroughly investigated. It looks as if, after all, there may have been more truth in the corpuscular theory of Sir Isaac Newton than we have hitherto dreamed of.—" Photographic News."

"LA LUMIERE NOIRE."

M. Perrigot, Chef de travaux a la faculté de Science de Lyon, has contributed to "The Journal of the Camera Club" (London), a paper on the above subject; the contribution we extract from the "Journal."

M. Gustave Le Bon has published an article in which he describes and discusses the results obtained from experiments made with what he calls the "lumière noire." The facts are shortly as follows :—

He takes an ebonite plate of the thickness of between 0.4 mm. and 0.7 mm., or let us say of an average of 0.5 mm., and substitutes it in place of the ordinary glass of a printing frame. In front of this ebonite plate he places certain metallic objects of different form, cut out from a sheet of zinc 0.5 mm. in thickness. Behind the ebonite plate he places a slow emulsion photographic plate, which has been previously exposed for two or three seconds to the light of a candle. He closes the frame carefully, and then exposes it to diffused light for about three hours. On developing the plate he sees on its generally fogged surface certain much darker images of the form of the metallic objects placed on the surface of the ebonite.

M. Le Bon explains these results by suggesting that the Black Light, which is a component part of the incident light, possesses a certain amount of energy, which the metal placed on the ebonite plate transforms in such a manner as to make it pass through the layer of ebonite, which is, he says, absolutely opaque to white light.

We have made these experiments in the same manner recommended, and using Lumière plates, yellow label, have obtained all the results above mentioned. But the explanation that M. Le Bon has given is obviously incorrect, for one cannot reasonably admit, in spite of his statement, that ebonite of the thickness of 0.5 mm. is absolutely opaque to white light; in fact, experience proves the contrary. If we make the experiment as mentioned above, but substitute in lieu of the exposed plate one of the same make not previously exposed, we obtain an inverse

result, the images of the metallic objcts appearing as clear glass on a gray background. Here then are two contradictory results: in the first case the metallic objects are endowed with the strange property of transforming part of the incident white light into black light, in the second, on the contrary, if we employ a sensitive plate that has not been subjected to any preliminary exposure, this property disappears and the ebonite has, apparently, acquired it.

The theory of M. Le Bon cannot hold good.

If we concentrate on the ebonite plate the light from a strong voltaic arc, the eye can easily perceive this light through the ebonite; one cannot understand why this ebonite plate which is transparent to the eye cannot be transparent to the photographic plate.

We have carried these experiments still farther, and instead of making certain parts of the ebonite plate opaque by placing metallic bodies upon it, we have, on the contrary, made a portion more transparent by cutting on one diagonal a groove 10 mm. broad and 0.2 mm. deep, and on the other diagonal have placed an ebonite band of the same dimensions. After an exposure of three hours to diffused light we have found on development a gray band and a dark band, corresponding to the two diagonals, on a background of intermediate opacity; at the point of intersection of the two diagonals the opacity is the same as that of the background.

These experiments have been carried out again with a sensitive plate that had not been subjected to any preliminary exposure, and the results obtained were, as we expected, the exact reverse of those mentioned above.

The black light, if it exists at all, has nothing whatever to do with the explanation of these results, which are due purely and simply to the transparency of ebonite to white light, and can be explained by the well-known phenomenon of the inversion of photographic images, the laws of which MM. A. and L. Lumiére explained in a communication to the "Société française de Photographie" on the 6th July, 1888, and which we mention here in a few lines.

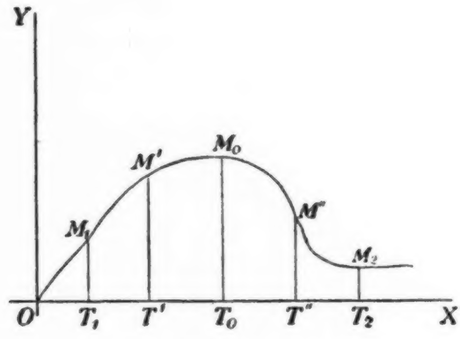
If we submit a series of gelatino bromide of silver plates of the same emulsion to the action, more and more prolonged, of a constant light, we find after development that the reduction of the bromide of silver at first increases rapidly with the duration of the exposure until it attains a maximum, and then diminishes to a certain point, beyond which no modification takes place however long the exposure may be.

We can represent this phenomenon by means of a curve, taking time for the abscissa and the opacity of the developed image for the ordinate.

In very weak opacities the actions are proportional to the duration of the exposure, and this action is nil when the time of exposure is nil.

The curve should, therefore, start from the point of origin, zero, and proceed in a right line from zero to a certain point M_1. From this point it bends, passing through a maximum M_0, corresponding to a duration ot exposure represented by $OT_0=t_0$. The opacity then diminishes regularly up to time $OT_2=t_2$, beyond which no variation is observable. These phenomena are very marked in the case of slow emulsions.

Let us now return to the facts with which we are dealing. The sensitive plate having been subjected to a preliminary exposure during the time OT′ (i.e. for a time less than OT_0) would have on development an opacity represented by M′T′. During the subsequent exposure to diffused light, the metallic objects placed on the ebonite plate do not allow any light to pass, and the corresponding portions of the sensitive plate retain after development the opacity corresponding to OT′ and represented by M′T′; the ebonite, on the other hand, allows the diffused



light to pass, and this light continues to affect the sensitive plate at all those portions which are not protected by the metal, and one sees that in an exposure sufficiently long, such as OT″, the corresponding opacity in the developed image is represented by M″T″, which is inferior to M′T′, and consequently that the images of the metal objects stand out black upon a gray background.

Obviously one can in the same manner explain the results obtained by diminishing the thickness of the ebonite plate and superposing the ebonite band, which acts in the same manner as the metal.

We come then to the conclusion that the results obtained by M. Le Bon are connected with certain phenomena the laws of which are perfectly well known. We can explain these results without introducing any such agent as the "black light," the existence of which still remains obscure and problematical.

THE JEX BARDWELL HOME.

(To be built in Detroit, Mich.)

To the few photographers in this country who do not know Jex Bardwell, what he is to photographers and photography, I would say that he is an old man, quite unable to take care of himself and his aged wife ; he is poor and without a home to shelter his gray head. He is an honorable, upright, modest and deserving man. In the past a scientific photographer ; a walking encyclopedia of photographic chemistry and formula pertaining to our art ; and through his expert knowledge became the valuable friend to all photographers. And this is the way of it :

The Cutting Bromide Patent, which had to do with the ambrotype, and pertained to the preparation of collodion, was regarded with suspicion by many photographers. It was a burden and an injustice to all men using collodion in photograph processes.

In 1867 the first convention of photographers called in America had for its object to consider a united action to resist the operation of that patent and defeat it. This convention was held at the Cooper Institute in New York City, and out of it grew the National Photographers' Association. After a running fight of two or three years, New York, Philadelphia, and Washington all taking a hand, without decisive result, up rose, at Detroit, Mich., the hero of that patent defeat, Jex Bardwell, who carried in the "inside pocket" of his memory the documents which overthrew the alleged validity of that patent, thereby saving thousands and thousands of dollars to photographers. He was never paid even the usual witness fees. "That's what old Jex Bardwell did for photographers ;" and now, photographers, ever appreciative and ready to acknowledge a plucky and unselfish act in their interest, have made a start to pool in their mite to build a home for him.

Let every photographer count himself "a pebble upon the beach" in this matter, and send his mite in a sealed envelope, bearing his own name and address in ink, and the legend, "For the Jex Bardwell Home." If he can put a bank-note in, and feel right about it, let him do it. If he thinks he can't quite afford it let him put in a few postage stamps, what he would pay for a cigar, a concert ticket, or a game of billiards, and send it at once, before there is a chance to forget about it. Enclose this envelope in another and direct to this magazine.

Let us make this old man and his good wife happy. It will cost us nothing to speak of, and it will warm his old heart to feel that thousands of friends from every end of the country have thought of his comfort and "seen to it."

There is a church at Wethersfield, Conn., built of onions—that is, contributions of onions. I read about it when a boy, and it lived in my mind

until I was a grown man, and when I came to see it I was almost disappointed that onions, built up in mortar, did not form its walls. A house built, at least in part, with postage stamps would be quite a novelty, and the photograph boys of this country are the lads to do it.

Now, speaking direct to the boys, after you have mailed your "stamps" a sense of quiet happiness will pervade your heart, and you will find that a good-natured act is its own reward.

I have sent in my own little budget and feel reasonably content with myself. That little parcel wants company; don't let it get lonesome,boys. Just notice how much better you will sleep after it. When you can feel that in that house your contribution paid for a shelf in the pantry, a shingle in the roof, a glass in a window, or some nails to hold parts together, you may pat yourself upon the back and call yourself a good fellow.

The envelopes you send your offerings in will all be carefully kept and turned over to Jex, and the photograph boys of Detroit will club together and help him paper his best room with them.

To all my friends who are in sympathy with me, and all those with whom I am not acquainted, but would be glad to be, let this letter be an introduction, and believe me,

Yours truly,.

James F. Ryder.

The up-to-date photographer is not content with the old styles of stereotyped illumination, but must needs place his model in all sorts of positions for lighting. The introduction of the slant light has found much favor with those who accommodate the leading taste in methods of illumination and we have seen some charming results therewith. Mr. Conrad Ripple, of Sunbury, Pa., sends us a number of beautiful examples of his work which display taste and sentiment in posing and an artistic feeling for effective lighting of the head. We give a sketch of his light which he has kindly furnished.

SLANT LIGHT.

CONRAD RIPPLE. SUNBURY, PA.

The following interview with Mr. Pire MacDonald, which appeared in the Albany, New York, "Argus," of September 12th, should set every photographer to thinking, coming, as it does, from a man who is so thoroughly in touch with every advance in photographic matters.

"What is to your mind the most interesting topic of the day ?—I mean to the amateur."

Please don't make that distinction. When it is a question of interesting topics, the amateur and professional should be equally interested in everything photographic, and they are. It seems to me, that ortho-chromatic photography is the most interesting problem we have ever had to tackle, and to-day it is being worked on to a greater or less extent by all photographers, high and low, amateur and professional. You know, of course, that in the ordinary dry plate, the blue and violet rays have a proportionately greater actinic than those from the other end of the spectrum—the greens, yellows and reds (actinism is defined by Webster as a property in the solar rays, which produces chemical changes as in photography) and as a consequence, when an exposure is made of a subject having a greater range of colors, such as, for example, the ordinary landscape, the blues in the sky are exposed so rapidly that they are overdone when sufficient exposure is given to get the detail in the greens and yellows.

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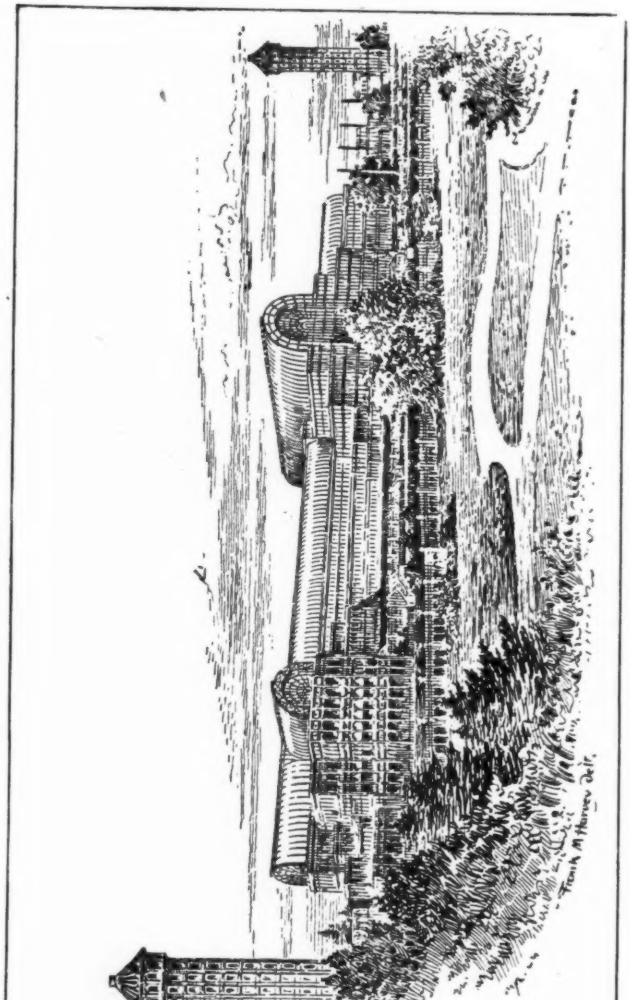

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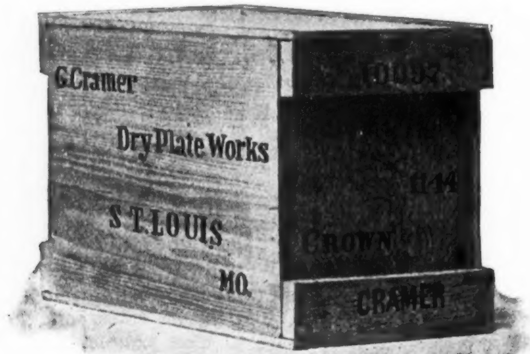

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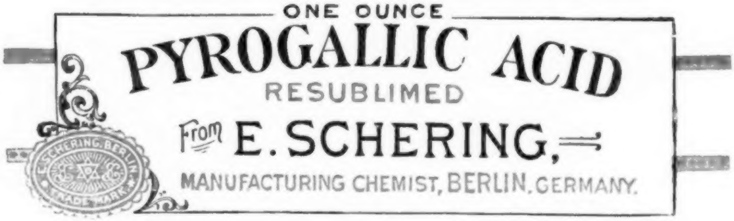

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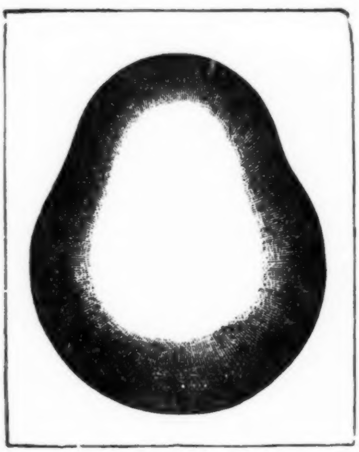

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